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PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION

Improvements in or relating to Vehicle Bodies Convertible from an Open to a Closed Condition

I, JOHN ROBERT VERNON DOLPHIN, a British Subject, of Bride Hall, Welwyn, Hertfordshire, do hereby declare the nature of this invention to be as follows:—

This invention relates to vehicle bodies and has for its main object to provide an improved form of hood or head cover for such bodies which can be raised or lowered at will, so as to enable an open vehicle to be converted to a closed coupé or *vice versa*.

According to the invention an automobile body is provided having a collapsible hood or coupé in which the roof is formed from a sheet element which is pivotally mounted in such a way that it may be swung forward or backward according as to whether the coupé is to be closed or open.

According to the preferred arrangement the sheet element forming the roof of the coupé is pivoted to a member which is in turn pivoted to the body or chassis of the vehicle in such a way that the sheet element which forms the roof when the device is in the raised position, also forms a part of the body of the vehicle when the device is in the lowered or collapsed position.

The member to which the roof element is pivoted and which is itself pivoted to the body or chassis of the vehicle, may itself comprise a second sheet element, the pivotal axes of the two elements being so arranged that when the device is in the raised position the said second sheet element is substantially vertical and forms with the first element, the back and roof of a coupé, means being provided for securing the front portion of the roof element to the windscreen of the vehicle.

In carrying my invention into effect in one convenient manner when applied to a light car, I form my collapsible hood or coupé from a plurality of sheet metal elements, one of which is so shaped as to

constitute the upper part or cover of the rear portion of the vehicle when the latter is open. This sheet element is conveniently made substantially flat or in a shallow curve from side to side and curves downwards from front to back, so that when it is mounted in collapsed position the front edge is level with the top of the sides of the vehicle and is arranged substantially flush with the top of the rear seat, while the rear edge is disposed at the tail of the vehicle just above the rear bumper. The rear edge of the element is hinged to the rear edge of a second sheet element, the forward edge of which is hinged to the body or chassis of the vehicle in such a position that this second element which is of substantially flat construction, lies in a substantially horizontal position. It will be seen that with this arrangement the first sheet element can be pulled forward when it is desired to convert the vehicle from an open car into a closed coupé, since this action will have the effect of raising the rear edge of the second sheet element which will swing about its supporting hinge as a pivot, the position of this hinge being so chosen that when the forward edge of the first sheet element reaches the upper edge of the windscreen, the second sheet element is substantially vertical, so that the two elements now form the roof and back of a closed coupé. In order to assist this swinging movement, a pair of helical spring members are provided which are tensioned between the second sheet element and the body of the vehicle at a position in front of and slightly above the supporting hinge, so that as the second sheet element begins to rise out of the horizontal position the pivotal action exerted by the spring members on this element is increased and the first element is swung forward without difficulty.

The major portion of the sides of the coupé may be formed by windows which

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may be slidably raised from the body of the vehicle by any suitable means, these windows being so shaped as to fit against the windscreen and roof of the coupé. In order to fill in the gaps between the rear edges of the windows and the back part of the coupé, two additional sheet elements are provided which are hinged to the sides of the aforesaid second sheet element so as to lie in a horizontal plane when the device is in the lowered or collapsed position. These additional elements are disposed on the rear part of the sides of the second element adjacent the rear edge which is hinged to the roof element, so that when the latter is pulled forward the two additional elements can be swung outwards into a substantially vertical position, the length of these elements being such that they cover the distance between the roof of the coupé and the sides of the body, while their width is sufficient to fill up the gaps between the back of the coupé and the rear edges of the side windows. Conveniently, the roof element is curved from side to side so as to overhang the side elements and windows so as to prevent any drips from entering the coupé, while the forward edge of the roof portion may also be curved so as to overhang the windscreen to which it may be firmly secured by a handle or other fastening device which may be conveniently attached to the underside of the forward part of the roof element and can be readily grasped by the user when the roof element is to be pulled forward.

It will be seen that with this arrangement an open car can be readily converted into a closed coupé at any time, simply by pulling forward the roofing element and swinging open the side pieces and that furthermore this action can be achieved by the occupant of the car without getting out

of the vehicle. It will also be seen that when the device is in the raised position, that is when the vehicle is converted into a closed coupé, a space is formed at the back of the vehicle which can be used for luggage and part of the element forming the back of the coupé may, therefore, be suitably strengthened by ribs or by other suitable means, and this element may also be provided with an aperture to serve as a rear window of the coupé.

It is to be understood that the invention is not to be regarded as being limited to the particular arrangement hereinbefore described, since it is capable of many modifications, for example, the elements which form the roof, back and side parts of the coupé instead of being formed of sheet metal may, if desired, be constructed of plastic material or of canvas or other flexible material stretched on suitably shaped frames, such frames being hinged together and pivotally mounted in the same way as the sheet metal elements hereinbefore described.

Furthermore, the sheet element which forms the roof of the coupé may be pivoted to a pair of side arms which are in turn pivoted to the body or chassis, the space between these side arms being filled in by a separate sheet element when the device is raised, this separate sheet element being either pivotally or detachably mounted in any convenient way. This modification enables the space at the back of the car to be used for luggage when the coupé is either open or closed since when the device is lowered or collapsed, the two pivoted side arms will swing down on either side of the luggage space which is then covered by the roof element.

Dated this 18th day of February, 1946.
MARKS & CLERK.

COMPLETE SPECIFICATION

Improvements in or relating to Vehicle Bodies Convertible from an Open to a Closed Condition

I, JOHN ROBERT VERNON DOLPHIN, a British Subject, of Bride Hall, Welwyn, Hertfordshire, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to vehicle bodies particularly for automobiles, boats, or aircraft, and has for its main object to provide an improved form of vehicle body which is adapted to assume either an open or a closed position so as to enable an open vehicle to be converted to a closed coupé or saloon or *vice versa*.

The invention accordingly consists in a vehicle body adapted to assume either an

open or a closed position comprising a substantially rigid roofpiece pivotally connected at its rear end to a substantially rigid member which forms the back of a coupé or saloon when the body is in the closed position, said member being in turn pivotally connected to the frame or chassis of the vehicle so as to form a support for said roofpiece when in the closed position and to permit said roofpiece to be swung backwards into an open position in which said member is swung down so as to lie under said roofpiece which itself forms part of the rear part of the body of the vehicle, means being provided which are operatively associated with said member in such a way that the swinging movement

of said roofpiece is automatically assisted when passing from the open to the closed position.

The invention will be more completely understood from the following detailed description which is given in conjunction with the accompanying drawings, in which:—

Figures 1 and 2 are side and plan views respectively of a car constructed in accordance with the invention and showing the roof of the car in the collapsed position;

Figures 3 and 4 are side and plan views respectively of the car shown in Figures 1 and 2 but with the roof in the raised or closed position;

Figure 5 is a rear view of the car shown in Figures 3 and 4.

Referring now to these drawings, the car shown is constructed with any suitable form of chassis to which are secured the engine (not shown), the steering column 1, the road wheels 2, 2', 3, 3', and the front and rear bumpers 4 and 5. The body is constructed from sheet metal or other similar material and comprises the usual side portions 6, foot-boards 7, doors 8, 8', bonnet or engine cover 9, front and rear wings 10 and 11, and a windscreen 12.

The head-cover or roof of the body consists of a sheet element 13 which may be substantially flat or slightly curved both from side to side and from front to back so that when it is in the collapsed position the front edge is substantially level with the top of the sides of the vehicle and substantially flush with the top of the rear seat, while the rear edge is disposed at the tail of the vehicle just above the rear bumper 5. The rear part of the roofpiece 13 is hinged or pivoted at each side at 27 to an element 14 which, when the device is swung forward into the raised position as shown in Figures 3 and 4, forms the rear corners and back of a coupé or saloon. This element 14 carries a pair of rods or shafts 15 which are hinged at 25 to the main frame or chassis of the vehicle, and the lower ends of these rods or shafts 15 are pivotally secured at 16 to the junction points of two pairs of strong helical springs 17, 17' and 18, 18', the ends of which are secured to the chassis of the vehicle. The element 14 which forms the rear corners and back of the coupé or saloon when raised may be conveniently constructed in the form of a single steel pressing, although, if preferred, the rear corners may be constructed in the form of two separate pressings, the back of the coupé or saloon being formed by a third pressing connected between the pressings forming the two corners. In either case the part forming the back of the coupé or saloon may be provided with a rear

window 26 at any convenient position.

It will be seen that with this arrangement the roofpiece 13 can be pulled forward by the handle 20 when it is desired to convert the vehicle from an open car into a closed coupé or saloon, since this action will have the effect of raising the element 14 which will swing about the hinges 25 which are so positioned that when the forward edge of the roofpiece 13 reaches the upper edge of the windscreen 12, the element 14 is substantially vertical or slightly inclined as shown so as to form the back of a closed coupé or saloon. This swinging movement is assisted by the helical springs 17, 17' and 18, 18', which are so tensioned that as the element 14 begins to rise out of the horizontal position these spring members exert an upward pressure on the rods 15 thus enabling the roof element 13 to be swung forward without difficulty.

The major portion of the sides of the coupé or saloon are formed by windows 21 and 22, which may be slidably raised from the body of the vehicle by any suitable means, while in order to fill in the gaps between the rear edges of the windows 21 and the side or corner parts of the element 14 of the coupé or saloon two additional frame members 23 are provided which are hinged to the forward edges of the element 14 so that they may be folded back against this element when the device is in the lowered or collapsed position and swung outwards into a substantially vertical position when the roof element 13 is pulled forward, the length of these elements 23 being such that they cover the distance between the roof of the coupé or saloon and the sides of the body, while their width is sufficient to fill up the gaps between the element 14 and the rear edges of the side windows 21. Conveniently, the roof element 13 is curved from side to side so as to overhang the side elements and windows so as to prevent any drips from entering the coupé or saloon, while the forward edge of the roof portion may also be curved so as to overhang the windscreen to which it may be firmly secured by a handle or other fastening device which may be conveniently attached to the underside of the forward part of the roof element 13 and can be readily grasped by the user when the roof element is to be pulled forward.

It will be seen that with this arrangement an open car can be readily converted into a closed coupé or saloon at any time simply by pulling forward the roofing element 13 and swinging open the side frames 23, and that furthermore this action can be achieved by the occupant of the car without getting out of the vehicle.

It will also be seen that when the device is in the raised position, that is when the vehicle is converted into a closed coupé or saloon, a space is formed at the back of the vehicle which can be used for luggage, parcels, or the like, while when the device is in the collapsed position the element 14 forming the back of the coupé or saloon swings down into a substantially horizontal position so as to fit into or over this space which is then completely covered by the roof element 13 which thus forms the upper part of the rear portion of the body of the vehicle. If desired, a flexible piece of waterproof material may be secured between the rear end of the body and the lower edge of the element 14 so that when the device is moved into the raised position this flexible member is automatically stretched over the luggage space so as to form a waterproof covering.

It is to be understood that the invention is not to be regarded as being limited to the particular arrangement hereinbefore described since it is capable of many modifications, for example the elements which form the roof, back and side parts of the coupé or saloon instead of being formed of sheet metal may, if desired, be constructed of plastic material or of canvas or of other flexible material stretched on suitably shaped frames, such frames being hinged together and pivotally mounted in the same way as the sheet metal elements hereinbefore described.

In another modification the helical springs 17, 17¹ and 18, 18¹ may be replaced by a pair of counterweights secured to the lower ends of the rods or shafts 15, the centre of gravity of these weights being disposed at a position beyond the pivotal axis of the side or corner elements with respect to the roofpiece so that these weights will tend to swing the rods or shafts 15 together with the back of the coupé or saloon into a vertical position and will thus assist the movement of the roofpiece when the latter is moved from the collapsed to the raised position.

Alternatively, these movements of the roofpiece may be assisted by torsion springs, hydraulic or electric power units, for example, by suitably arranged hydraulic rams, or by an electric motor associated with the roofpiece by a suitably arranged cable.

While the invention has been described as applied to a road vehicle such as a small car, it is to be understood that it is not to be regarded as being limited to a vehicle of this character since it may be readily applied to any form of road or rail vehicle, or to boats or aircraft, when it is desired to provide facilities for open-

ing or closing the body, cabin or cockpit at will.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A vehicle body adapted to assume either an open or a closed position comprising a substantially rigid roofpiece pivotally connected at its rear end to a substantially rigid member which forms the back of a coupé or saloon when the body is in the closed position, said member being in turn pivotally connected to the frame or chassis of the vehicle so as to form a support for said roofpiece when in the closed position and to permit said roofpiece to be swung backwards into an open position in which said member is swung down so as to lie under said roofpiece which itself forms part of the rear part of the body of the vehicle, means being provided which are operatively associated with said member in such a way that the swinging movement of said roofpiece is automatically assisted when passing from the open to the closed position.

2. A vehicle body according to Claim 1, wherein said roofpiece is formed from a sheet or frame element which is pivoted to said member in such a way as to form a covering for both the front and rear seats of the vehicle when raised and which swings clear of the rear seats when swung into the lowered or collapsed position.

3. A vehicle body according to Claim 1, wherein said member is so shaped and arranged as to form the back and rear corner elements of a coupé or saloon when the roofpiece is in the raised position.

4. A vehicle body according to Claim 1, wherein said member is pivoted to the frame or chassis of the vehicle by supporting rods or shafts having extensions beyond their pivotal axes which are secured to one or more sets of helical springs anchored to the main frame or chassis in such a way as to urge said supporting rods or shafts towards the vertical position when said roofpiece is moved from one position to the other.

5. A vehicle body according to Claim 1, wherein said member is pivoted to the frame or chassis of the vehicle by supporting rods or shafts having extensions beyond their pivotal axes to which are attached counterweights so arranged as to urge said rods or shafts towards the vertical position when said roofpiece is moved from one position to the other.

6. A vehicle body according to Claim 1, wherein said member is pivoted to the frame or chassis of the vehicle by supporting rods or shafts having extensions

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beyond their pivotal axes which are associated with hydraulic or electric means so arranged as to urge said rods or shafts towards the vertical position when said roofpiece is moved from one position to the other.

7. A vehicle body according to Claim 3, and comprising a pair of pivotally mounted side frames or like devices which are so arranged as to fill up part of the sides of the coupé or saloon when the roofpiece is in the raised position and to fold back on the corner elements when the roofpiece is in the collapsed position.

8. A vehicle body according to any one of the preceding claims, wherein the rear part of the body is so shaped as to provide a space for luggage or the like which is automatically covered by said roofpiece when placed in the collapsed position.

9. A vehicle body according to Claim 8, wherein means are provided for auto-

matically covering said space when said roofpiece is moved into the raised position.

10. A vehicle body according to Claim 9, wherein said means comprises a flexible cover which is so arranged as to be automatically drawn over said space when the roofpiece is moved into the raised position.

11. A vehicle body according to any one of the preceding claims, wherein means are provided whereby said roofpiece may be detachably secured to the upper part of the windscreen when said roofpiece is moved into the raised position.

12. A vehicle body for automobiles, boats or aircraft, constructed, arranged and operating substantially as described and as illustrated in the accompanying drawings.

Dated this 16th day of January, 1947.

MARKS & CLERK.

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[This Drawing is a reproduction of the Original on a reduced scale.]

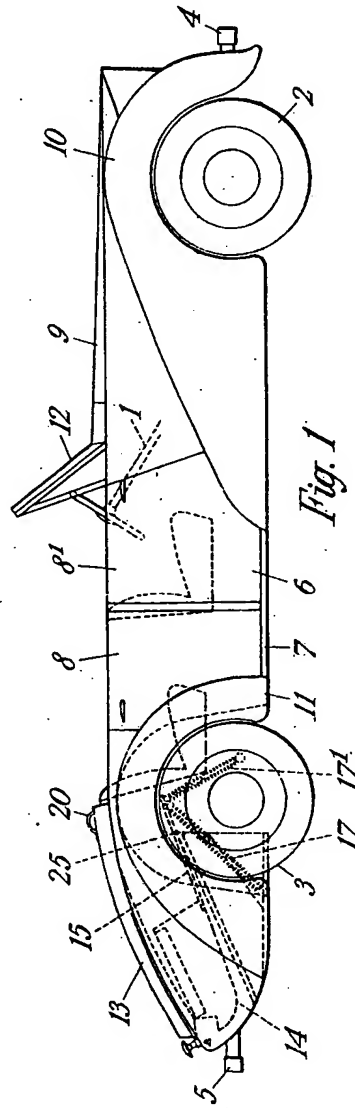


Fig. 1

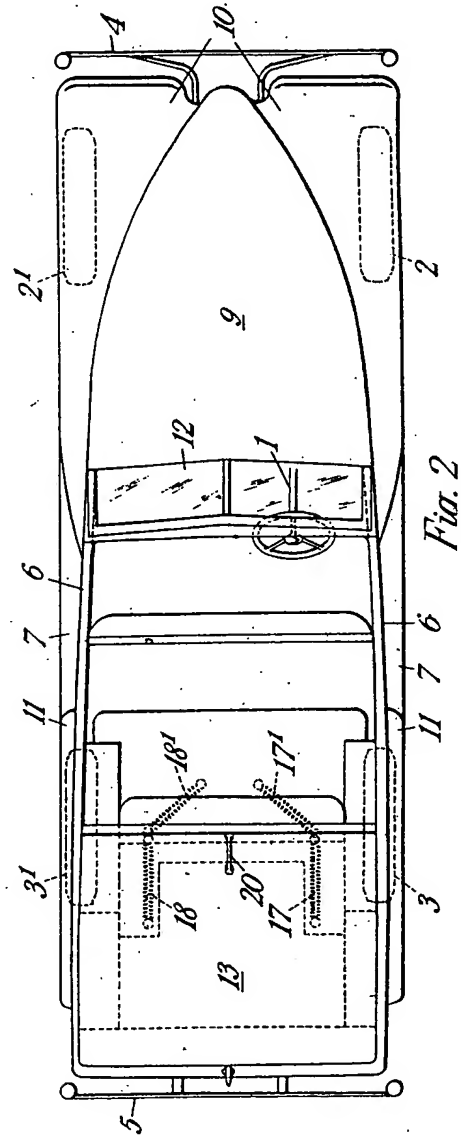


Fig. 2

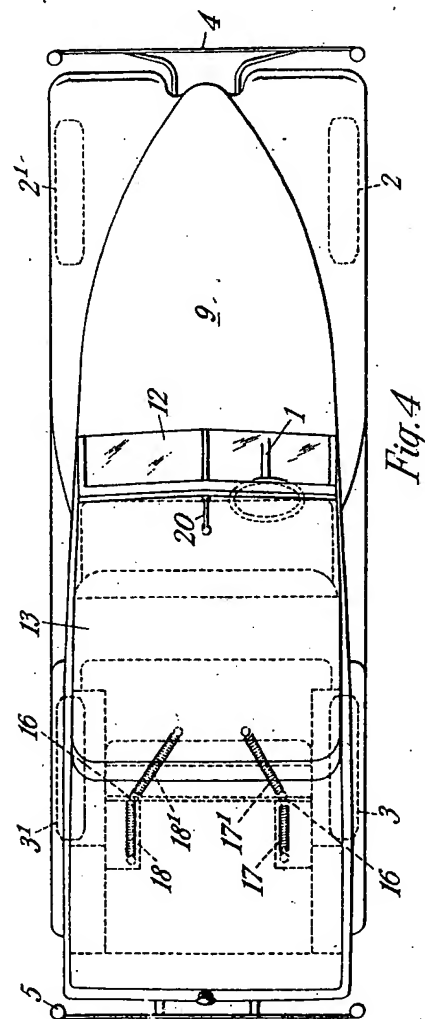
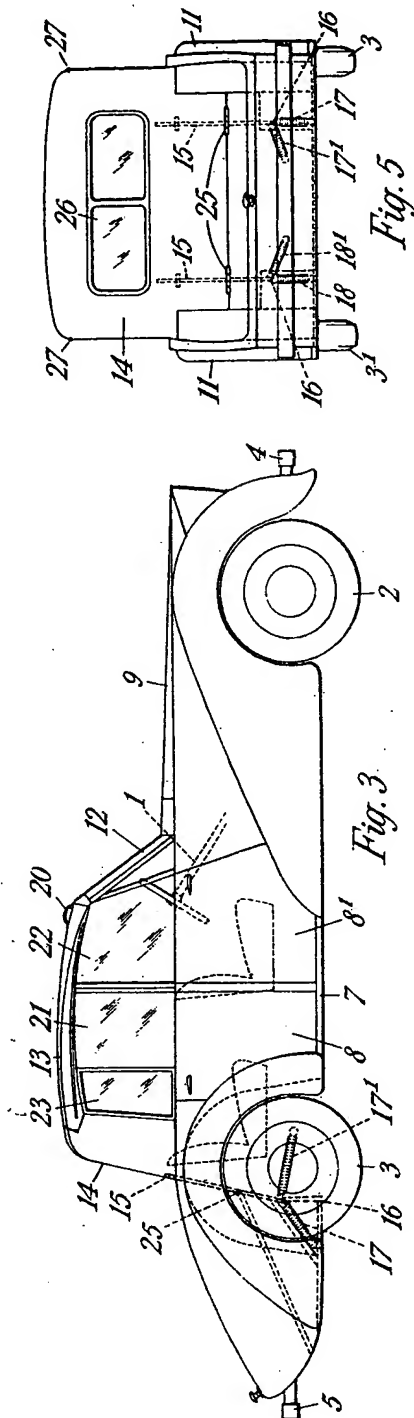
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2 SHEETS

SHEET 1

SHEET 2



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